## ABSTRACT

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A dual structure for a multiplexing section extended to an OSU is obtained without adding a dynamic function, such as an optical switch, to a W-MULDEM. The W-MULDEM of an optical wavelength division multiplexing access system divides, among ports corresponding to the individual ONUs, downstream optical signals having wavelengths \(\lambda\)d1 to  $\lambda dn$ , which are received along a current-use optical fiber, or downstream optical signals having wavelengths  $\lambda d1 + \Delta \lambda$  to  $\lambda dn + \Delta \lambda$ , which are received along a redundant optical fiber. The W-MULDEM also multiplexes, for the port that corresponds to the current-use optical fiber or the redundant optical fiber, upstream optical signals having wavelengths  $\lambda u1$  to  $\lambda un$  or wavelengths  $\lambda u1+\Delta\lambda$  to  $\lambda$ un+ $\Delta\lambda$ , which are received along optical fibers corresponding to the ONUs. A wavelength difference between the downstream optical signal and the upstream optical signal that are consonant with each ONU is defined as an integer times the FSR of an AWG.